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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|---|-------------|----------------------|-----------------------------|------------------|
| 10/815,431 | 03/31/2004 | Prashant Sethi | 42P17830 | 7655 |
| 8791 7590 01/30/2007 BLAKELY SOKOLOFF TAYLOR & ZAFMAN 12400 WILSHIRE BOULEVARD SEVENTH FLOOR LOS ANGELES, CA 90025-1030 | | | EXAMINER ZAMAN, FAISAL M | |
| | | | ART UNIT 2111 | PAPER NUMBER |
| SHORTENED STATUTORY PERIOD OF RESPONSE | | MAIL DATE | DELIVERY MODE | |
| 3 MONTHS | | 01/30/2007 | PAPER | |

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

| | | | |
|------------------------------|------------------------|---------------------|--|
| Office Action Summary | Application No. | Applicant(s) | |
| | 10/815,431 | SETHI ET AL. | |
| | Examiner | Art Unit | |
| | Faisal Zaman | 2111 | |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 20 November 2006.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-35 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-35 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 20 November 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. **Claims 1-3, 7, 8, and 10** are rejected under 35 U.S.C. 102(e) as being anticipated by Madukkarumukumana et al. ("Madukkarumukumana") (U.S. Patent Publication No. 2005/0125580).

Regarding Claim 1, Madukkarumukumana discloses a method comprising:

Receiving an interrupt message from a device (Figure 1, item 120, Page 3, paragraph 24) via a shared interrupt interface (Page 3, paragraph 30, "integrated circuit to steer and redirect interrupts"), wherein the device supports a plurality of operating entities (Figure 2, items 248/258/268/269; ie. the interrupt generating device 290 has the ability to send interrupts to the various virtual machines);

Checking one or more status registers associated with the shared interrupt interface (Figure 2, item 212, Page 3, paragraph 31, "participant table" in Madukkarumukumana is considered equivalent to the registers of the instant application) to identify an interrupt status of a device (Figure 2, items 245, 255, 256, or

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265; ie. wherein the interrupt status is which types of interrupts the processors are currently servicing, based on the VM-IDs of the virtual machines); and

Transmitting an indication of the interrupt message to one or more selected operating entities associated with the identified device (Figure 1, item 160, Page 3, paragraph 27, the virtual machines are considered equivalent to the "operating entities" in the current application), wherein the selected operating entities comprise a subset of the plurality of operating entities, the transmitting based at least in part on the identified interrupt status (Figure 2, items 248/258/268/269, Page 3, paragraphs 0030-0033; ie. the interrupt is sent to only one of the plurality of virtual machines, based on it's VM-ID).

Regarding Claim 2, Madukkarumukumana discloses wherein the one or more selected operating entities comprises one or more virtual machines (Figure 2, items 245, 255, and 265, Page 3, paragraphs 30 and 33).

Regarding Claim 3, Madukkarumukumana discloses wherein the one or more selected operating entities comprises threads in a multi-threaded operating environment (Page 3, paragraph 32, it is understood that the hyper-threaded processor of Madukkarumukumana would be used in a multi-threaded operating environment).

Regarding Claim 7, Madukkarumukumana discloses wherein the one or more operating entities comprise virtual machines registered to have access to the identified device (Page 2, paragraphs 21-22).

Regarding Claim 8, Madukkarumukumana discloses further comprising executing an interrupt service routine chain with each of the one or more virtual machines (Page 5, Claim 13).

Regarding Claim 10, Madukkarumukumana discloses wherein transmitting an indication of the interrupt message to one or more operating entities based on the identity of the device comprises transmitting an identity of the device (Page 3 paragraph 24, and Page 4 Claim 1, it is understood that when an interrupt is associated with a VM-ID by the IO hub in Madukkarumukumana and then sent to the associated virtual machine, the identity of the device generating the interrupt is also transmitted to the virtual machine).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. **Claim 4-6, 9, and 11-35** are rejected under 35 U.S.C. 103(a) as being unpatentable over Madukkarumukumana in view of Le (U.S. Patent No. 6,908,038).

Madukkarumukumana discloses all of the elements as stated above, except Madukkarumukumana does not specify what type of register, bus, or bus standard is

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used. The Examiner takes official notice that the PCI bus standard, PCI Express bus standard, and PCI standard in general are well-known types of standards available in the prior art at the time of the applicant's claimed invention, as evidenced by Le (Column 1, lines 41-60).

Accordingly, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the PCI bus standard, PCI Express bus standard, and/or the PCI standard for the system disclosed by Madukkarumukumana.

Claims 11-20 are directed to an article comprising a computer accessible medium, **Claims 21-27** are directed to an apparatus of the method of Claims 1-10, and **Claims 28-35** are directed to a system of the method of Claims 1-10.

Madukkarumukumana and Le teach, either alone or in combination as stated above, the method as set forth in Claims 1-10. Therefore, Madukkarumukumana and Le also teach, either alone or in combination as stated above, an article comprising a computer accessible medium as set forth in Claims 11-20. Further, Madukkarumukumana and Le teach, either alone or in combination as stated above, teaches an apparatus and system as set forth in Claims 21-27 and Claims 28-35, respectively.

Response to Arguments

5. Applicant's arguments filed 11/20/2006 have been fully considered but they are not persuasive.

Regarding Claim 1, Applicants argue that "Madukkarumukumana does not disclose checking one or more status registers associated with a shared interrupt interface to identify an interrupt status of a device." The examiner disagrees. Contrary to Applicants' argument, since the claim language specifies checking the interrupt status of a device, this device can be interpreted as one of the processors 245, 255, 256, or 265 (rather than the interrupt generating device 290 as Applicants argue). The participant table 212 (equated to the status registers of the instant application) contains information on which types of interrupts each of the processors are currently servicing based on the VM-IDs of the various virtual machines being run on each processor, see Page 3, paragraph 0031. Therefore, when an interrupt is received at the integrated circuit 210, its VM-ID is checked against the information in participant table 212 (see Figure 1, items 150, and Page 3, paragraphs 0026 and 0031), and based on the interrupt status of each of the processors (e.g. which types of interrupts the processors are currently servicing, based on the VM-IDs) an indication of the received interrupt is transmitted to the appropriate processor, see Figure 1, item 160 and Page 3, paragraph 0027. "Status" is defined in the American Heritage Dictionary (Fourth Edition), as "position relative to that of others; standing" or "a state of affairs". Given the broadest reasonable interpretation and the above definition, the examiner equates "interrupt status" with which types of interrupts the processors are currently servicing based on the received interrupt's associated VM-IDs.

Regarding Applicant's argument that Madukkarumukumana does not disclose checking a status register of a shared interrupt interface to identify a device (see

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Remarks, page 14 line 15 – page 15 line 20), these arguments are moot since the claim has been amended to check the status registers to identify the interrupt status of a device, not the identity of the device itself. In addition, as described above, “a device” is now interpreted by the examiner as processors 245, 255, 256, or 265, rather than interrupt generating device 290.

Therefore, the pending claims stand as previously rejected.

6. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Faisal Zaman whose telephone number is 571-272-6495. The examiner can normally be reached on Monday thru Friday, 8 am - 5:30 pm.

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If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark Rinehart can be reached on 571-272-3632. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

fmz



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